

(1) Close to, and upstream of, the carburetor; and

(2) So that it is equally distributed over the entire cross section of the induction system air passages.

**§ 23.1097 Carburetor deicing fluid system capacity.**

(a) The capacity of each carburetor deicing fluid system—

(1) May not be less than the greater of—

(i) That required to provide fluid at the rate specified in § 23.1095 for a time equal to three percent of the maximum endurance of the airplane; or

(ii) 20 minutes at that flow rate; and

(2) Need not exceed that required for two hours of operation.

(b) If the available preheat exceeds 50° F. but is less than 100° F., the capacity of the system may be decreased in proportion to the heat rise available in excess of 50° F.

**§ 23.1099 Carburetor deicing fluid system detail design.**

Each carburetor deicing fluid system must meet the applicable requirements for the design of a fuel system, except as specified in §§ 23.1095 and 23.1097.

**§ 23.1101 Induction air preheater design.**

Each exhaust-heated, induction air preheater must be designed and constructed to—

(a) Ensure ventilation of the preheater when the induction air preheater is not being used during engine operation;

(b) Allow inspection of the exhaust manifold parts that it surrounds; and

(c) Allow inspection of critical parts of the preheater itself.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-43, 58 FR 18974, Apr. 9, 1993]

**§ 23.1103 Induction system ducts.**

(a) Each induction system duct must have a drain to prevent the accumulation of fuel or moisture in the normal ground and flight attitudes. No drain may discharge where it will cause a fire hazard.

(b) Each duct connected to components between which relative motion

could exist must have means for flexibility.

(c) Each flexible induction system duct must be capable of withstanding the effects of temperature extremes, fuel, oil, water, and solvents to which it is expected to be exposed in service and maintenance without hazardous deterioration or delamination.

(d) For reciprocating engine installations, each induction system duct must be—

(1) Strong enough to prevent induction system failures resulting from normal backfire conditions; and

(2) Fire resistant in any compartment for which a fire extinguishing system is required.

(e) Each inlet system duct for an auxiliary power unit must be—

(1) Fireproof within the auxiliary power unit compartment;

(2) Fireproof for a sufficient distance upstream of the auxiliary power unit compartment to prevent hot gas reverse flow from burning through the duct and entering any other compartment of the airplane in which a hazard would be created by the entry of the hot gases;

(3) Constructed of materials suitable to the environmental conditions expected in service, except in those areas requiring fireproof or fire resistant materials; and

(4) Constructed of materials that will not absorb or trap hazardous quantities of flammable fluids that could be ignited by a surge or reverse-flow condition.

(f) Induction system ducts that supply air to a cabin pressurization system must be suitably constructed of material that will not produce hazardous quantities of toxic gases or isolated to prevent hazardous quantities of toxic gases from entering the cabin during a powerplant fire.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-7, 34 FR 13095, Aug. 13, 1969; Amdt. 23-43, 58 FR 18974, Apr. 9, 1993]

**§ 23.1105 Induction system screens.**

If induction system screens are used—

(a) Each screen must be upstream of the carburetor or fuel injection system.

(b) No screen may be in any part of the induction system that is the only

## § 23.1107

passage through which air can reach the engine, unless—

(1) The available preheat is at least 100° F.; and

(2) The screen can be deiced by heated air;

(c) No screen may be deiced by alcohol alone; and

(d) It must be impossible for fuel to strike any screen.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964; 30 FR 258, Jan. 9, 1996, as amended by Amdt. 23-51, 61 FR 5137, Feb. 9, 1996]

### § 23.1107 Induction system filters.

If an air filter is used to protect the engine against foreign material particles in the induction air supply—

(a) Each air filter must be capable of withstanding the effects of temperature extremes, rain, fuel, oil, and solvents to which it is expected to be exposed in service and maintenance; and

(b) Each air filter shall have a design feature to prevent material separated from the filter media from interfering with proper fuel metering operation.

[Doc. No. 26344, 58 FR 18974, Apr. 9, 1993, as amended by Amdt. 23-51, 61 FR 5137, Feb. 9, 1996]

### § 23.1109 Turbocharger bleed air system.

The following applies to turbocharged bleed air systems used for cabin pressurization:

(a) The cabin air system may not be subject to hazardous contamination following any probable failure of the turbocharger or its lubrication system.

(b) The turbocharger supply air must be taken from a source where it cannot be contaminated by harmful or hazardous gases or vapors following any probable failure or malfunction of the engine exhaust, hydraulic, fuel, or oil system.

[Amdt. 23-42, 56 FR 354, Jan. 3, 1991]

### § 23.1111 Turbine engine bleed air system.

For turbine engine bleed air systems, the following apply:

(a) No hazard may result if duct rupture or failure occurs anywhere between the engine port and the airplane unit served by the bleed air.

(b) The effect on airplane and engine performance of using maximum bleed air must be established.

(c) Hazardous contamination of cabin air systems may not result from failures of the engine lubricating system.

[Amdt. 23-7, 34 FR 13095, Aug. 13, 1969, as amended by Amdt. 23-17, 41 FR 55465, Dec. 20, 1976]

## EXHAUST SYSTEM

### § 23.1121 General.

For powerplant and auxiliary power unit installations, the following apply—

(a) Each exhaust system must ensure safe disposal of exhaust gases without fire hazard or carbon monoxide contamination in any personnel compartment.

(b) Each exhaust system part with a surface hot enough to ignite flammable fluids or vapors must be located or shielded so that leakage from any system carrying flammable fluids or vapors will not result in a fire caused by impingement of the fluids or vapors on any part of the exhaust system including shields for the exhaust system.

(c) Each exhaust system must be separated by fireproof shields from adjacent flammable parts of the airplane that are outside of the engine and auxiliary power unit compartments.

(d) No exhaust gases may discharge dangerously near any fuel or oil system drain.

(e) No exhaust gases may be discharged where they will cause a glare seriously affecting pilot vision at night.

(f) Each exhaust system component must be ventilated to prevent points of excessively high temperature.

(g) If significant traps exist, each turbine engine and auxiliary power unit exhaust system must have drains discharging clear of the airplane, in any normal ground and flight attitude, to prevent fuel accumulation after the failure of an attempted engine or auxiliary power unit start.

(h) Each exhaust heat exchanger must incorporate means to prevent blockage of the exhaust port after any internal heat exchanger failure.

(i) For the purpose of compliance with § 23.603, the failure of any part of